### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

### MEMORANDUM

DATE:

October 31, 2011

TO:

Chris Lanane, Steve Mobley

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Dirty Socks, October 31, 2011," for your review. Please refer any comments you may have on the document to me by January 3, 2012. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

# Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

## SITE: DIRTY SOCKS

Report Date: October 31, 2011 Prepared by: Mike S. Horn

### 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Dirty Socks was audited on October 31, 2011. The audit was conducted by Mike Horn and was witnessed by Steve Mobley, who is the site operator.

### 2.0 Parameters Audited:

T.E.O.M. PM-10

### 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

### 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

### Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) **AUDIT**

Date of report:	10/31/11					
Date:	10/31/11			Site name: 1	Dirty Socks	
Start:	10:10hrs. PS	ST			Steve Mobley	
Finish:	10:30hrs. PS	ST		Project: 5	SB 270	
Audited By:	Mike Horn			Site Elevation:	3590	ft.
Witness:	Steve Mobley			Amb. Pres.:	899.70	hPa
				Amb. Temp.:	15.1	deg. C
Prop. or Serial No.:	225500			Make:	R & P	
Type:	PM-10			Model:	1400ab	
				Last cal. date:	8/17/11	
	AUD	IT DEVICE(S)				
Make:	BGI Incorporated			Make: 1	BGI Incorporated	
Model:	DELTA CAL			Model: 1	DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lp	m		Range:	2 - 20	lpm
a	Calibration Factors				Calibration Factor	s
Slope:				Slope:	1.00	
Intercept:				Intercept:	0.00	
Cal date:				Cal Date:	1/4/11	
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:		0.300	16.9	1.8	898.53	-1.2
Dark current:	•	N/A				
	$Qa = [dPxTa/Pa]^{1/2} + b$		Site		Nominal	Flow Rates
Audit	Audit Flow	Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.89	16.89	16.66	-1.4	15.0	18.4
Bypass/Aux Flow Rate	13.87	13.87	13.66	-1.5		
Main Flow Rate	2.98	2.98	3.00	0.7	2.7	3.3
<b>Total Flow Rate</b>	16.98	16.98	16.66	-1.9	15.0	18.4

Comments: None.

### TABLE A-1

## GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measureme	nt Variable	Evaluation Criteria
Wind Speed		At ws $\leq$ 5 m/s, input $\pm$ 0.25 m/s; At ws $>$ 5 m/s, input $\pm$ 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direct	ion	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperatur	e	input $\pm$ 0.5° C Gravimetry Lab $\pm$ 1.0 deg. C input $\pm$ 2.0° C for PM-10, PM-2.5 samplers
Relative Hu	midity	Ambient: input $\pm$ 5% RH, $\pm$ 1.5°C as dew point Gravimetry Lab: input $\pm$ 5%
Precipitation	ı	input ± 10%
Barometric l	Pressure	Ambient: input ± 10 hPa TEOM: ± 10 mm mercury
PM-10: Hi-V PM-2.5	Vol SSI, Partisol, BGI,	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 4%; Design Flow $\pm$ 5%
TEOM:	Total Flow Main Flow Bypass Flow	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM Bypass Flow: < 0.60 LPM

Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

### AUDIT DEVICE

	Serial #	Cal Date:	Slope:	Intercept:	
BGI Delta CAL:	123	1/24/11	1.0	0.0	
BGI Delta CAL:	525	1/4/11	1.0	0.0	
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209	
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0	
RM Young wind speed motor:	CU10, HS10	8/30/11	N/A	N/A	
Psychro-Dyne Psychrometer:	RH 04	N/A	1 0	1 0	
Texas Electronics FC-525 Precipitation:	52202	N/A			
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6	

** ****				Air Pollution Co		er <del>sees</del> entermiss		
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						0 1		-}-
Date:	10/3//1/	1	1	Site Name	: 10 ml	Vach		
Start:	10:10	PST		Operator		mari	/	+-
Finish:	10:30	PST			: SB270/	morey		
	14			Site Elevation	:	ft	+	
		-	The seminar masses	Amb. Press.		in. Hg		
			<del></del>	Amb. Temp.	V L L	deg. C		
				Trans. (cinp.	101	deg. c		
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Type:	PM10	1			1400a ,			+-
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		1		Lust Gar. Date.	6// 1///			-
		Audit	Device(s)		/ /	+		-
Make:	DCT THOOP			Make:	DOT THE	DD 00	ļ	_
	BGI INCOR	RUKAL	tu	Model:		RPORATED		
S/N:	DELTA CAL	16	<del> </del>		DLL IA CA	Y		
Range:	V123 5	<u> </u>	ļ	S/N:				
Calibration factors:	2 - 20	lpm		Range:	2 - 20	Ipm		
			Calib	ration factors:				
Slope:	1.0	-		Slope:				
Int.:	0/			Int.:	0.0		AAT AAT	
Cal Date:	1/4/1	/	ļ	Cal Date:				
				L				
Q <sub>a</sub> =m[d	PxT <sub>a</sub> /P <sub>a</sub> ] <sup>1/2</sup> +b		Altitude Corr	ection Factor:	-1013			1
								1
Leak Check-Initial	Main:	.05	Aux:	543				1
Leak Check-Final	Main:	- A Color Maria	Aux:	12				+
	1			1				-
			Site		Nominal F	low Rates		-
Audit	Audit Flow	Rate	Flow Rate	Diff.	Lower Limit	Upper Limit		
Point	delta P	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)		+-
Total Fow Rate	16.89		3 66/13.	66-16.64		18.4		+-
Aux. Flow Rate	13,87		13.66	20 16.00		10.4		+
Main Flow Rate	2.98		3.00		2.7	3.3		ļ
Total Flow Rate	16.98		9, ,		15.0	18.4		
	16.10		16.66-		10.0	10.4		<b></b>
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"	Sampler		True	Raw				
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Comments:								
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### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

### MEMORANDUM

DATE:

July 15, 2011

TO:

Chris Lanane, Steve Mobley

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Dirty Socks, July 15, 2011," for your review. Please refer any comments you may have on the document to me by September 15, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

# Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

## SITE: DIRTY SOCKS

Report Date: July 15, 2011 Prepared by: Mike S. Horn

### 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Dirty Socks was audited on July 14, 2011. The audit was conducted by Mike Horn and was witnessed by Steve Mobley, who is the site operator.

### 2.0 Parameters Audited:

#### T.E.O.M. PM-10

#### 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

### 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

### Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) AUDIT

Date of report:	7/15/11					
Date:	7/14/11			Site name: I	Dirty Socks	
Start:	11:30hrs. PST	•		Operator: S	Steve Mobley	
Finish:	11:50hrs. PST	•		Project: S	SB 270	
Audited By:	Mike Horn			Site Elevation:	3590 ft	
Witness:	Steve Mobley			Amb. Pres.:	887.20 h	Pa
				Amb. Temp.:	28.9 d	eg. C
Prop. or Serial No.:	225500			Make:	R & P	
Туре:	PM-10			Model:	1400ab	
				Last cal. date:	5/11/11	
	AUDIT	DEVICE(S)				
Make: I	3GI Incorporated			Make: I	3GI Incorporated	
Model: I	DELTA CAL			Model: I	DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lpm	L		Range:	2 - 20 lp	<mark>om</mark>
	Calibration Factors				Calibration Factors	
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal date:	1/4/11			Cal Date:	1/4/11	
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.040	0.120	27.7	-1.2	885.36	-1.8
Dark current:	N/A	N/A				
	$Qa = [dPxTa/Pa]^{1/2} + b$		Site		Nominal F	low Rates
Audit	Audit Flow	Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.99	16.99	16.66	-1.9	15.0	18.4
Bypass/Aux Flow Rate	13.96	13.96	13.66	-2.1		
Main Flow Rate	3.07	3.07	3.00	-2.3	2.7	3.3
Total Flow Rate	16.96	16.96	16.66	-1.8	15.0	18.4

Comments: None.

Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	<u>Cal Date:</u>	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

### TABLE A-1

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measureme	ent Variable	Evaluation Criteria
Wind Speed	d	At ws $\leq$ 5 m/s, input $\pm$ 0.25 m/s; At ws $>$ 5 m/s, input $\pm$ 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direc	rtion	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperatu	re	input $\pm$ 0.5° C input $\pm$ 2.0° C for PM-10, PM-2.5 samplers
Relative Hu	umidity	Ambient: input $\pm$ 5% RH, $\pm$ 1.5°C as dew point Gravimetry Lab: input $\pm$ 5%
Precipitatio	n	input $\pm 10\%$
Barometric	Pressure	Ambient: input $\pm$ 10 hPa TEOM: $\pm$ 10 mm mercury
PM-10: Hi- PM-2.5	Vol SSI, Partisol, BGI,	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 4%; Design Flow $\pm$ 5%
TEOM:	Total Flow Main Flow Bypass Flow	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM

Bypass Flow: < 0.60 LPM

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Date	: 7/14/11			Site Name	: NSIAT.	1.1	-	+
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туре.	PINIU				: 140ga			
		-		Last Cal. Date	5/11/11			
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		Audit	Device(s)					
	BGI INCOR	PORAT	ED.	Make:		RPORATED		
Model:	DELTA CAL		1	Model:	DEL TA CAL			
S/N:	0123 52	5		S/N:	0123			1
Range:	0123 52 2 - 20	Ipm		Range:	Land Carl	Ipm	<del>                                     </del>	
Calibration factors:	- LM		Calib	ration factors:				1
Slope:	1.0			Slope:				1-
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Q <sub>4</sub> -m[c	PXI Paj +b		Altitude Corre	ection Factor:	-1013			
Leak Check-Initial	Main:	.04	Aux:	.12				7 >>>
Leak Check-Final	Main:	<u> </u>	Aux:					1
			Site		Nominal F	low Rates		1
Audit	Audit Flow	Rate	Flow Rate	Diff.	Lower Limit	Upper Limit		+
Point	delta P	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)		†
Total Fow Rate	16 99		A 114	6= 16 66	15.0	18.4		-
Aux. Flow Rate	13.96		13,66	0-16. pl	10.0	10.4		ļ
Main Flow Rate	3.67		3.00		2.7	3.3		
Total Flow Rate			The same of the sa			A Administration of the Control of t		
Total How Mate	16.96	_,	16.66		15.0	18.4		L
	Community of		Stand					
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### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

### MEMORANDUM

DATE:

May 10, 2011

TO:

Chris Lanane, Steve Mobley

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Dirty Socks, May 10, 2011," for your review. Please refer any comments you may have on the document to me by July 11, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

# Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

## SITE: DIRTY SOCKS

Report Date: May 10, 2011 Prepared by: Mike S. Horn

#### 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Dirty Socks was audited on May 9, 2011. The audit was conducted by Mike Horn and was witnessed by Steve Mobley, who is the site operator.

#### 2.0 Parameters Audited:

T.E.O.M. PM-10

### 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

### 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

### Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) AUDIT

Date of report:	5/10/11					
Date:	5/9/11			Site name:	Dirty Socks	
Start:	10:10hrs. P	ST		Operator:	Steve Mobley	
Finish:	10:25hrs. P	ST		Project:	SB 270	
Audited By:	Mike Horn			Site Elevation:	3590	ft.
Witness:	Steve Mobley			Amb. Pres.:	884.80	hPa
				Amb. Temp.:	14.5	deg. C
Prop. or Serial No.:	225500			Make:	R & P	
Туре:	PM-10		×	Model:	1400ab	
				Last cal. date:	2/23/11	
	AUE	OIT DEVICE(S)				
Make:	BGI Incorporated			Make:	BGI Incorporated	
Model:	DELTA CAL			Model:	DELTA CAL	
S/N:	525			S/N:	525	
Range:	2 - 20 lg	om		Range:	2 - 20	lpm
	Calibration Factors				Calibration Factor	rs
Slope:	1.00			Slope:	1.00	
Intercept:	0.00			Intercept:	0.00	
Cal date:	1/4/11			Cal Date:	1/4/11	
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.
Leak check:	0.000	0.050	14.1	-0.4	881.31	-3.5
Dark current:	N/A	N/A				
	$Qa=[dPxTa/Pa]^{1/2}+$	b	Site		Nominal	l Flow Rates
Audit	Audit Flo	w Rate,	Flow Rate	Diff.	Lower Limit	Upper Limit
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)
Total Flow Rate	16.91	16.91	16.67	-1.4	15.0	18.4
Bypass/Aux Flow Rate	13.94	13.94	13.67	-1.9		
Main Flow Rate	3.07	3.07	3.00	-2.3	2.7	3.3

Comments: None.

16.96

16.96

16.67

-1.7

15.0

18.4

**Total Flow Rate** 

### TABLE A-1

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measureme	ent Variable	Evaluation Criteria
Wind Speed	d.	At ws $\leq$ 5 m/s, input $\pm$ 0.25 m/s; At ws $>$ 5 m/s, input $\pm$ 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H
Wind Direc	etion	input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor
Temperatu	re	input $\pm$ 0.5° C input $\pm$ 2.0° C for PM-10, PM-2.5 samplers
Relative Hu	umidity	Ambient: input $\pm$ 5% RH, $\pm$ 1.5°C as dew point Gravimetry Lab: input $\pm$ 5%
Precipitatio	n	input $\pm 10\%$
Barometric	Pressure	Ambient: input $\pm$ 10 hPa TEOM: $\pm$ 10 mm mercury
PM-10: Hi- PM-2.5	Vol SSI, Partisol, BGI,	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 4%; Design Flow $\pm$ 5%
TEOM:	Total Flow Main Flow Bypass Flow	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10%
TEOM:	Leak Check	Main Flow: < 0.15 LPM

Bypass Flow: < 0.60 LPM

Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

AUDIT DEVICE	Serial #	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	1/24/11	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		
Chinook Eng. Streamline FTS	108	9/8/10	0.41	0.6

	Т	apered		lating Microba	lance (TEOM)		
				W AUDIT			157 P. C. (1) (1) (1)
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	11 17				.0:	0	
Date				Site Name	· New /	Sache	
Start	1 1 4 /	PST		Operator		mobile	
Finish:	10:25	PST			: SB270 /	Y	
	10.00			Site Elevation		ft	+
				Amb. Press.		ft in. Hg	]= ====
				Amb. Temp.	150	deg. C	
		/	1	ļ	5337		
Prop. Or Ser. No.:		ď	1	Make			
Type:	PM10	-			1400a		
				Last Cal. Date:	2/23/1		
		ļ	1		1-71		
			Device(s)	ļ			
Make:	BGI INCOR	PORAT	ED	Make:	- KING - LUVIN	RPORATED	
Model:	DELTA CAL	1.		Model:	DELTA CAL		
S/N:	0123 - 5	15_		S/N:	0123		
Range:	2 - 20	Ipm		Range:	2 - 20	Ipm	
Calibration factors:			Calib	ration factors:			
Slope:	1.0	1		Slope:	1.0		
Int.:	0,0			Int.:	0.0		
Cal Date:	1/4/11	1		Cal Date:		ş	
	-112			I			
Q <sub>a</sub> =m[c	PxT <sub>e</sub> /P <sub>e</sub> J <sup>1/2</sup> +b		Altitude Corn	ection Factor:	÷ 1013		
Leak Check-Initial	Main:	,00	Aux:	. 05			7.5
Leak Check-Final	Main:		Aux:				
			Site		Nominal F		
Audit	Audit Flow		Flow Rate	Diff.	Lower Limit		
Point	delta P	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)	
Total Fow Rate	16.71		3.00/13.6	7=16.6	15.0	18.4	
Aux. Flow Rate	13.74		13:67				
Main Flow Rate	13.87		3.00		2.7	3.3	
Total Flow Rate	16.96		16.6)		15.0	18.4	
			Stan				
Amala Tanan	Sampler		True	Raw			
Amb Temp	14./		0.001 21	15.0			
Amb Press	- 870		881.31	884.8			
						10-16-	
						- 7	
Comments:							
Comments:							
Comments:							

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

### MEMORANDUM

DATE:

January 26, 2011

TO:

Chris Lanane, Steve Mobley

FROM:

Mike Horn

SUBJECT:

Quality Assurance Audit Report

Attached is the draft version of the document, "Great Basin Unified Air Pollution Control District Quality Assurance Audit Report, Dirty Socks, January 26, 2011," for your review. Please refer any comments you may have on the document to me by March 28, 2011. If no comments are received by that date, the report will be considered final.

Thank you for your cooperation in this matter.

# Great Basin Unified Air Pollution Control District Quality Assurance Audit Report

### SITE: DIRTY SOCKS

Report Date: January 26, 2011 Prepared by: Mike S. Horn

#### 1.0 Introduction

As part of the Great Basin Unified Air Pollution Control District's (District) quality assurance (QA) program, periodic audits are conducted on the monitoring stations throughout the District. These checks, which are conducted by personnel other than those associated with the day-to-day operation and maintenance of the stations, provide additional assurance that the data collected are of high quality and meet the project objectives. The achievement of these objectives can be determined, in part, by establishing criteria within which monitoring equipment is to be operated and then testing that equipment regularly to verify its operation within those criteria.

In keeping with the District's QA program goals, the T.E.O.M. PM-10 Monitoring Station at Dirty Socks was audited on January 25, 2011. The audit was conducted by Mike Horn and was witnessed by Steve Mobley, who is the site operator.

#### 2.0 Parameters Audited:

#### T.E.O.M. PM-10

### 3.0 Results and Actions

The results of the audit are summarized below. Any problems found are addressed under the heading, "Action," and are given below. Sensor responses not specifically addressed below responded within the audit criteria limits. The audit data are presented in detail in Appendix A. The certifications of the audit devices are presented in Appendix B. Audit criteria based on Title 40 code of Federal Regulations Part 58, Appendix A (October 2006), the USEPA Quality Assurance Handbook for Air Pollution Measurement Systems Volumes II, 1997, and IV, 2007, and/ or on the manufactures recommendations, are presented in table A-1.

#### 4.0 Recommendations and Comments

There are no recommendations or comments at this time.

APPENDIX A

## Great Basin Unified Air Pollution Control District Tapered Element Oscillating Microbalance (TEOM) ${\bf AUDIT}$

D	a locales							
Date of report:	1/26/11							
Date:	1/25/11			Site name:	•			
Start:		13:00hrs. PST			Operator: Steve Mobley			
Finish:	13:20hrs. I	PST		Project:				
Audited By:	Mike Horn			Site Elevation:	3590	ft.		
Witness:	Steve Mobley			Amb. Pres.:	895.80	hPa		
				Amb. Temp.:	14.5	deg. C		
Prop. or Serial No.:	225500			Make:	R & P			
Type:	PM-10			Model:	1400ab			
				Last cal. date:	11/5/10			
	AUI	OIT DEVICE(S)						
Make:	BGI Incorporated			Make: 1	BGI Incorporated			
Model: DELTA CAL				Model: DELTA CAL				
S/N:	525			S/N:	525			
Range:	2 - 20 1	pm		Range:	2 - 20	lpm		
Calibration Factors				Calibration Factors				
Slope:	1.00			Slope:	1.00	2		
Intercept:	0.00			Intercept:	0.00			
Cal date:	1/4/11			Cal Date:	1/4/11			
	Main:	Aux:	Sampler temp:	Diff.	Sampler press:	Diff.		
Leak check:	-0.010	-0.030	13.7	-0.8	894.48	-1.3		
Dark current:	N/A	N/A						
	Qa=[dPxTa/Pa] <sup>1/2</sup> +	b	Site		Nominal	Flow Rates		
Audit	Audit Flow Rate,		Flow Rate	Diff.	Lower Limit	Upper Limit		
Point	ΔP, in. H2O	(VLPM)	(VLPM)	(%)	(LPM)	(LPM)		
Total Flow Rate	17.06	17.06	16.67	-2.3	15.0	18.4		
Bypass/Aux Flow Rate	14.00	14.00	13.67	-2.4				
Main Flow Rate	3.00	3.00	3.00	0.0	2.7	3.3		
Total Flow Rate	17.01	17.01	16.67	-2.0	15.0	18.4		

Comments: None.

### TABLE A-1

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE PERFORMANCE AUDIT CRITERIA

Measurement Variable		Evaluation Criteria			
Wind Speed		At ws ≤ 5 m/s, input ± 0.25 m/s; At ws > 5 m/s, input ± 5% Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor and NRG Max 40H			
Wind Direction		input ± 5° Starting threshold: 0.5 m/s; R. M. Young 05305 Wind Monitor AQ Starting threshold: 1.0 m/s; R. M. Young 05103 Wind Monitor			
Temperature		input $\pm$ 0.5° C input $\pm$ 2.0° C for PM-10, PM-2.5 samplers			
Relative Humidity		Ambient: input $\pm$ 5% RH, $\pm$ 1.5°C as dew point Gravimetry Lab: input $\pm$ 5%			
Precipitation		input ± 10%			
Barometric Pressure		Ambient: input ± 10 hPa TEOM: ± 10 mm mercury			
PM-10: Hi-Vol SSI, Partisol, BGI, PM-2.5		input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 4%; Design Flow $\pm$ 5%			
TEOM:	Total Flow Main Flow Bypass Flow	input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10% input $\pm$ 10%; Design Flow $\pm$ 10%			
TEOM:	Leak Check	Main Flow: < 0.15 LPM			

Bypass Flow: < 0.60 LPM

### Appendix B

### GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT QUALITY ASSURANCE CERTIFICATIONS OF AUDIT DEVICES

### AUDIT DEVICE

	<u>Serial #</u>	Cal Date:	Slope:	Intercept:
BGI Delta CAL:	123	12/22/09	1.0	0.0
BGI Delta CAL:	525	1/4/11	1.0	0.0
Testo 735-1	01467895/712	12/16/10	1.0006	0.0209
Barigo Altimeter/Barometer:	P9	12/17/10	1.0	0.0
RM Young wind speed motor:	CUO1, HSO1	12/3/10	N/A	N/A
Cole-Parmer 3312-40 Psychrometer:	RH 03	12/10/04	Wet 1.0037 Dry 1.0059	Wet -0.0598 Dry -0.1518
Texas Electronics FC-525 Precipitation:	52202	N/A		

	apered			nance (TEOM)	11.11.215.15.4.44	*** **** *** **	
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		1		100	0 //		
11111111					Jacke		
					mobile/		
13:26	PST						
					ft	1	
					in. Hg	1	******
			Amb. Temp.	14.5	deg. C		
		<u> </u>		1 Language			7511-
22508							
PM10							
		1	Last Cal. Date:	11/5/16			
				1 -1			
	Audit	Device(s)				l	
BGI INCOR	PORAT	FD.	Make:	BGT TNCO	RPORATED	1	
DELTA CAL	e mass		Model:	DEL TA CAL	STATE II		
0123 52	5			ULL IA UNI		†	
2 - 20	Ipm			VICO	Ipm		_
		Calib	ration factors:	2 - 20			
7 O F	1						
							_
114/2						<u> </u>	_
	1				·		-
PyT /P 11/2+h		Altitude Corn	oction Factor	. 1017			
I KI E I I I		Aididde Com	Tactor.	- 1013		ļ	
Main	- 0.1						
	.01		.03				
wain:		Aux:					
		Company of the Compan		Nominal F	low Rates		
		the same of the sa	and the same of th				
	(VLPM)		(%)		(LPM)		
1,06			7=166	7 15.0	18.4		ONTORNO
14.0		13.67					
3.60		3.00		2.7	3.3		-0000
17.6)		16.67		15.0	18.4		
THE RESERVE OF THE PARTY OF THE							
		Stan	dard				
Sampler		True	Raw				
13.7	5		14.5				
883		89448	895.4				
		7.7	0				-
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						···	_
						i-	
			1	18			
	1/25/11   13:00   13:26   13:26   13:26   13:26   14:25   15:26   15	Tapered    1/15//	Tapered Element Oscil FLO	Tapered Element Oscillating Microbs FLOW AUDIT    13.00   PST   Operator   13.26   PST   Project   Site Elevation   Amb. Press.     Amb. Temp.     Amb. Temp.     Amb. Temp.     Audit Device(s)     BGI INCORPORATED   Make     DELTA CAL   Model     0123   52   5   S/N:   2 - 20   Ipm   Calibration factors:  1 0   Slope:   O 0   Int.:   Audit Flow Rate   Flow Rate   Diff.     delta P   (VLPM)   (VLPM)   (%)     1 0   3 0 13 07   2 16 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			